Figure lengend

Figure S1. Taxonomic distributions of surface sediment sequences based on NirS-Type and NirK-Type denitrifiers in Zhoucun reservoir. (A) Distributions of bacterial phyla of surface sediment based on NirS-Type denitrifier; (B) Distributions of bacterial Proteobacteria of surface sediment based on NirS-Type denitrifier; (C) Distributions of β-Proteobacteria of surface sediment based on NirS-Type denitrifier; (D) Distributions of *Dechloromonas* of surface sediment based on NirS-Type denitrifier; (E) Distributions of bacterial phyla of surface sediment based on NirK-Type denitrifier; (F) Distributions of bacterial genus of surface sediment based on NirK-Type denitrifier (note the change in x-axis scale).

Figure S2. OTUs distributions of profile of water body and surface sediment according to Venn analysis in enhanced and control systems, respectively. (A, B, C, D, represent the OTUs distributions in control system; a, b, c, d, represent the OTUs distributions in enhanced system).

Figure S3. Cluster analysis of OTUs profile of surface sediment for NirS-Type and NirK-Type denitrifiers according to Bray Curtis distance (the average linkage) in Zhoucun reservoir. (A, Cluster analysis based on NirS-Type denitrifier; B, Cluster analysis based on NirK-Type denitrifier).

Figure S4. Taxonomic distributions of surface sediment sequences based on NirS-Type and NirK-Type denitrifiers during the whole experimental period in Zhoucun reservoir. (A) Distributions of bacterial for NirS-Type denitrifier based on genus level; (B) Distributions of bacterial for NirK-Type denitrifier based on species.

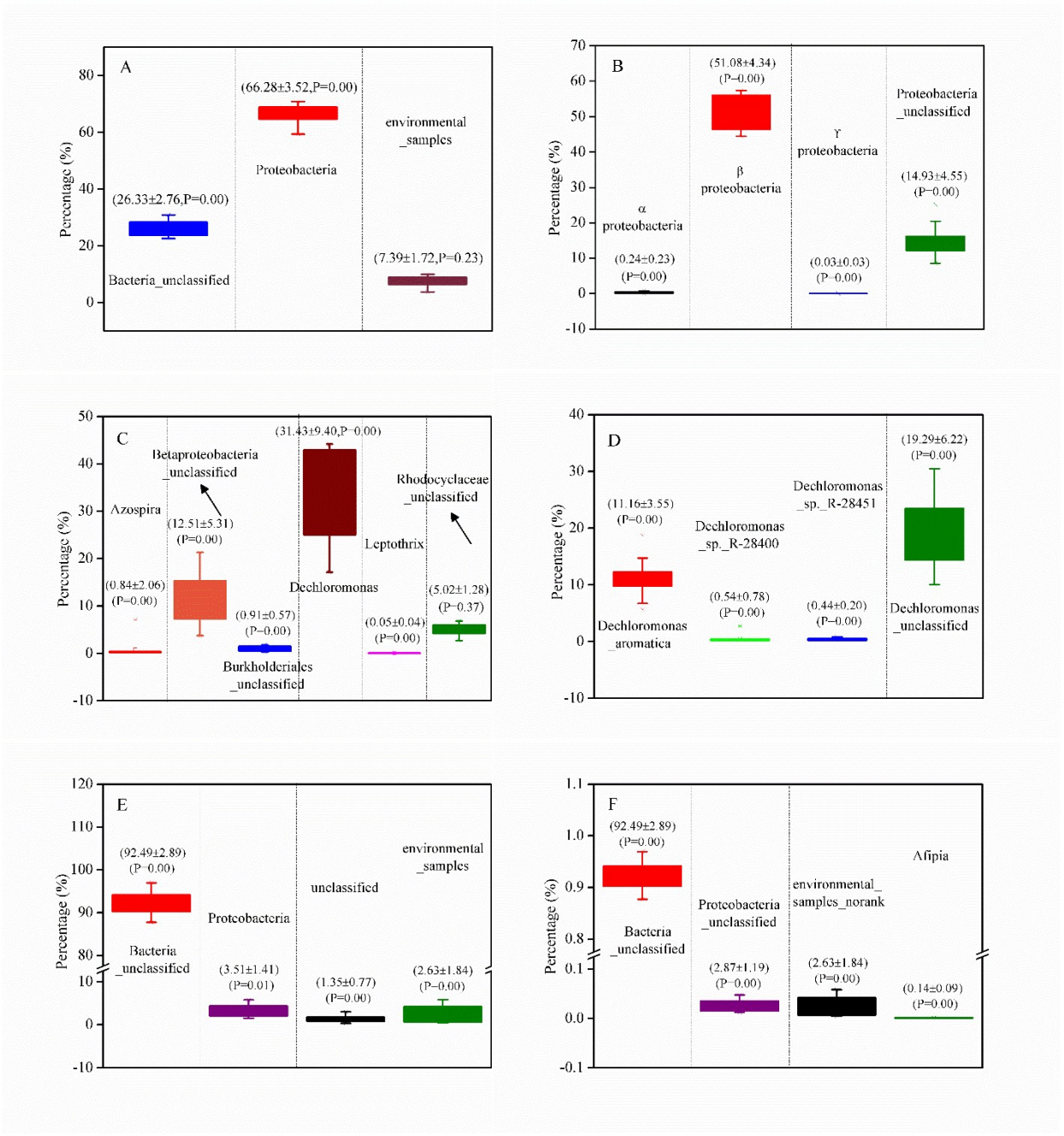

A
Percentage (%)
(66.28±3.52,P=0.00)
Proteobacteria
environmental
_samples
(26.33±2.76,P=0.00)
Bacteria_unclassified
(7.39±1.72,P=0.23)
B
Percentage (%)
(51.08±4.34)
(P=0.00)
β
proteobacteria
γ
proteobacteria
Proteobacteria
_unclassified
(14.93±4.55)
(P=0.00)
α
proteobacteria
(0.24±0.23)
(P=0.00)
(0.03±0.03)
(P=0.00)
C
Percentage (%)
(31.43±9.40,P=0.00)
Betaproteobacteria
_unclassified
Rhodocyclaceae
_unclassified
Azospira
(12.51±5.31)
(P=0.00)
Leptothrix
(0.84±2.06)
(P=0.00)
Dechloromonas
(5.02±1.28)
(P=0.37)
(0.91±0.57)
(P=0.00)
(0.05±0.04)
(P=0.00)
Burkholderiales
_unclassified
D
Percentage (%)
(19.29±6.22)
(P=0.00)
Dechloromonas
_sp._R-28451
(11.16±3.55)
(P=0.00)
Dechloromonas
_sp._R-28400
(0.54±0.78)
(P=0.00)
(0.44±0.20)
(P=0.00)
Dechloromonas
_aromatica
Dechloromonas
_unclassified
E
Percentage (%)
(92.49±2.89)
(P=0.00)
environmental
_samples
unclassified
Proteobacteria
Bacteria
_unclassified
(3.51±1.41)
(P=0.01)
(1.35±0.77)
(P=0.00)
(2.63±1.84)
(P=0.00)
F
Percentage (%)
(92.49±2.89)
(P=0.00)
Afipia
environmental_
samples_norank
Proteobacteria
_unclassified
Bacteria
_unclassified
(2.87±1.19)
(P=0.00)
(2.63±1.84)
(P=0.00)
(0.14±0.09)
(P=0.00)

Figure S1

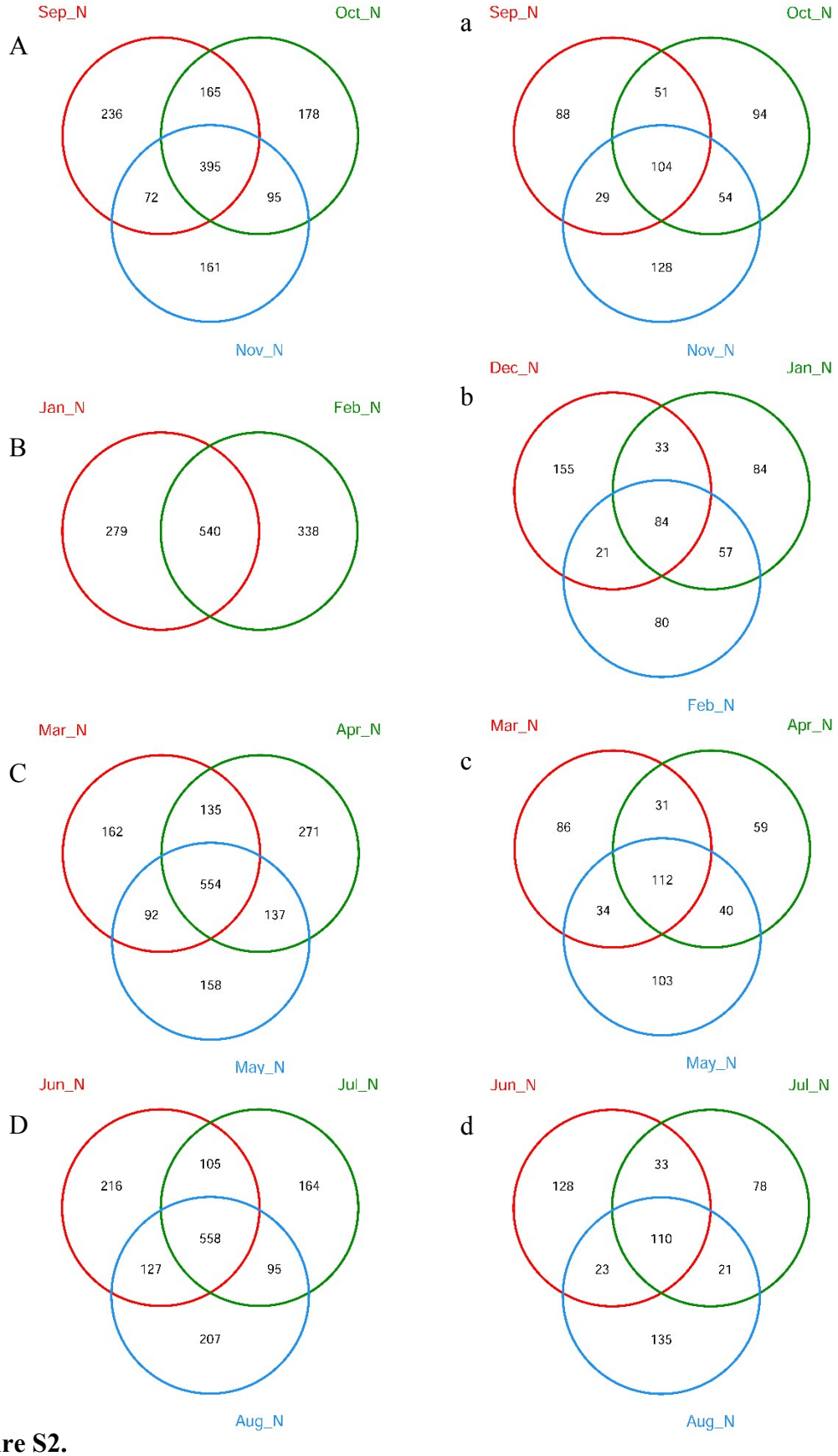
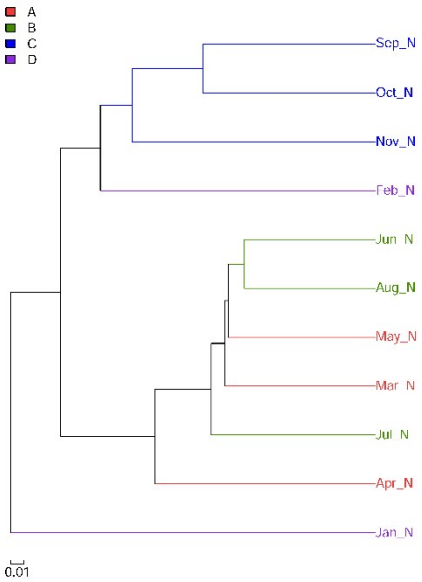

A
Sep_N
Oct_N
Nov_N
236
165
178
395
72
95
161
a
Sep_N
Oct_N
Nov_N
88
51
94
104
29
54
128
B
Jan_N
Feb_N
279
540
338
b
Dec_N
Jan_N
Feb_N
155
33
84
84
21
57
80
C
Mar_N
Apr_N
May_N
162
135
271
554
92
137
158
c
Mar_N
Apr_N
May_N
86
31
59
112
34
40
103
D
Jun_N
Jul_N
Aug_N
216
105
164
558
127
95
207
d
Jun_N
Jul_N
Aug_N
128
33
78
110
23
21
135

Figure S2.

A


A
B
C
D
Sep_N
Oct_N
Nov_N
Feb_N
Jun_N
Aug_N
May_N
Mar_N
Jul_N
Apr_N
Jan_N
0.01

B

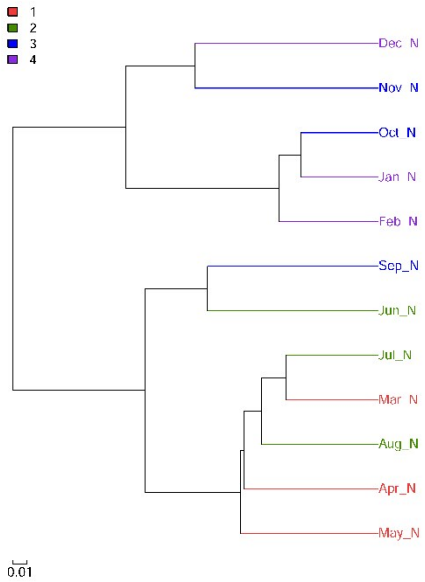

1
2
3
4
Dec_N
Nov_N
Oct_N
Jan_N
Feb_N
Sep_N
Jun_N
Jul_N
Mar_N
Aug_N
Apr_N
May_N
0.01

Figure S3.

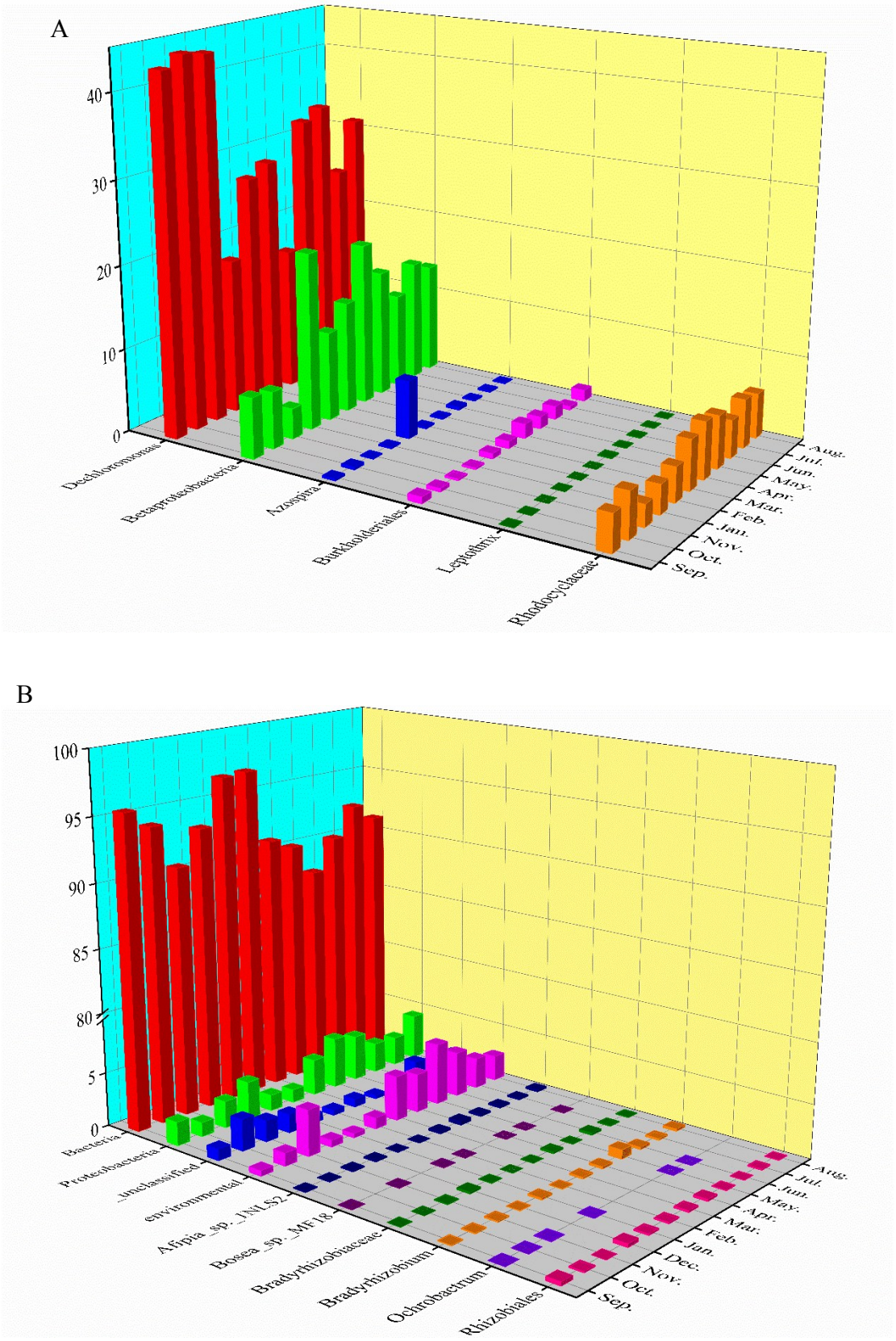

A
40
30
20
10
0
Dechloromonas
Betaproteobacteria
Azospira
Burkholderiales
Leptothrix
Rhodocyclaceae
Aug.
Jul.
Jun.
May.
Apr.
Mar.
Feb.
Jan.
Nov.
Oct.
Sep.
B
100
95
90
85
80
5
0
Bacteria
Proteobacteria
_Unclassified
environmental
Affipia _sp. _JNLS2
Bosea _sp. _MF18
Bradyrhizobiaceae
Bradyrhizobium
Ochrobactrum
Rhizobiales
Aug.
Jul.
Jun.
May.
Apr.
Mar.
Feb.
Jan.
Dec.
Nov.
Oct.
Sep.

Figure S4.

Table S1. The variations of surface sediment denitrification rate from Sep. (2014) to Aug. (2015) in Zhoucun Reservoir ecosystem.

	System	Mean	S.D
Autumn	Sep.	73.94	16.73
	Oct.	46.44	6.89
	Nov.	473.10	16.62
Winter	Dec.	336.07	17.69
	Jan.	27.31	8.88
	Feb.	44.04	0.59
Spring	Mar.	60.85	15.31
	Apr.	83.38	11.44
	May.	115.49	21.80
Summer	Jun.	3.72	1.83
	Jul.	3.75	1.63
	Aug.	9.49	0.53

Note, Denitrification rate, $nmolN_2/ (gdw \cdot hr)$; the background denitrification rate was measured using the acetylene inhibition technique; S.D, Standard Deviation.

Table S2 Pearson correlation between sediment parameters and potential influencing factors in Zhoucun Reservoir during one year.

Variations	STN	STP	MC	DR	AD	NirS	T
STN	1						
STP	0.324	1					
MC	-0.239	-0.397	1				
DR	-0.566	-0.194	-0.013	1			
AD	0.134	-0.409	0.184	-0.350	1		
NirS	0.112	-0.456	0.066	-0.480	0.641*	1	
T	0.066	-0.324	-0.265	0.261	0.665*	0.325	1

Note, STN, TN (sediment); STP, TP (sediment); NirS, NirS function genus; * means Correlation is significant at the 0.05 level (2-tailed).